

British Armoured Battle Group

Tim Mätzold & Daniel Nowak



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*Royal Armoured Corps Media Centre
1st (UK) Armoured Division*

*And thanks to all the soldiers that supported us in finishing this
project and who satisfied our demands! Special thanks to
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and his "special coffee"!*

Introduction

It is a cold night at the end of March. The sky is clear and the stars are shining brightly over the Polish plain. It would be most unexpected to meet anybody in this deep forest, but suddenly there is the smell and taste of smoke. Soldiers sitting around a fire are having a cigarette while being briefed by their troop leader ahead of the next day's action. The air tastes of smoke, grease and diesel fuel, as well-camouflaged vehicles lie silent parked between the trees. The impressive sound of Challenger 2 Main Battle Tanks (MBT) can be faintly heard in the distance.

This scenario sounds a bit like an adventure for these soldiers of the Reconnaissance Troop of the Royal Dragoon Guards. The troops are only at the end of a single day of a two-week exercise named *Prairie Eagle 2*, which was held at the Drawsko-Pomorskie Training Area (DPTA) in Poland from 10-28 March 2006. The aim of this exercise

was to prepare the Royal Dragoon Guards, the armored regiment of the 4th Armoured Brigade (Osnabrück, Germany), currently based at Münster, Germany, to train as part of an Armoured Battle Group.

The subject of this volume is the formation of an Armoured Battle Group, illustrated through the example of the *Royal Dragoon Guards*, an armored regiment that forms the backbone of the *Royal Dragoon Guards Battle Group*. Further key elements covered in this volume are the **Armoured Infantry** explained by the Scots Guards and the Light Infantry Battle Group, plus *29 Armoured Engineer Squadron* and *35 Engineer Regiment*, which act as the engineer detachment that supports the **Light Infantry Battle Group**. In addition, the book also includes other main supporting elements that form and support a Battle Group in the direct fire zone.



*The FV107 Scimitar CVR(T) is a light armored reconnaissance vehicle originally intended for the close reconnaissance role. It is used by the reconnaissance troop and by the **Interim Medium Armour Squadron (IMA)** within armored regiments. It is armed with a 30mm L21A2 RARDEN gun and a coaxial 7.62mm L37A1 machine gun. The Scimitar has a crew of three - driver, commander and gunner. It is a somewhat compact vehicle, so space for the crew is limited. The driver is situated on the vehicle's left-hand side next to the engine compartment. In the turret the commander is situated on the left and the gunner on the right, protected by turret armor composed of welded aluminum plates.*

Armoured Battle Group

The 1st (UK) Armoured Division (1 DIV) is the sole British division that remains based in Germany, with its HQ based at Herford. This division consists of three brigades:

- 4th Mechanized Brigade, Osnabrück (Returning to the UK in 2008)
- 7th Armoured Brigade, Bad-Fallingb. (Fallingb. Forest)
- 20th Armoured Brigade, Paderborn.

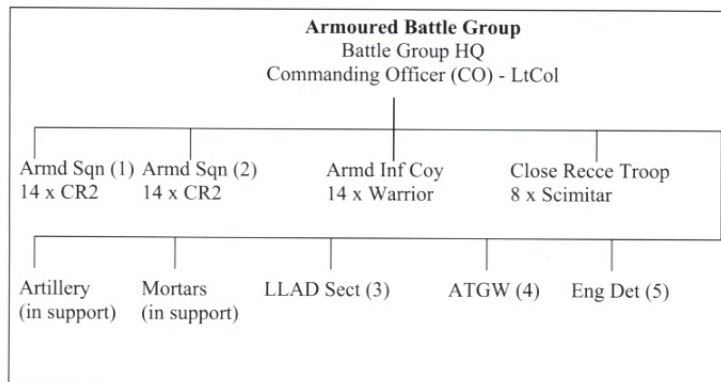
These brigades are sub-divided into smaller formations known as **Battle Groups (BG)**, the fundamental element of fighting formations. A BG is a versatile and highly flexible organization that is always formed with the appropriate mix of infantry, armor and supporting arms according to the task at hand. There is no standard structure or ORBAT, as the units assigned can be quickly regrouped depending on the threat and the tactical situation.

A typical BG fighting a defensive battle on the FEBA (Forward Edge of the Battle Area), based on an organization of one armored squadron and two mechanized companies, might contain about 450 soldiers, fourteen tanks and approximately thirty Infantry Fighting Vehicles (IFV).

The total number of BGs in a division or brigade depends on the task the formation has been allotted. Generally a division will have about nine BGs, and a brigade will contain up to three BGs. Focusing in more detail on 1 DIV, there are two kinds of BGs:

- Armoured Battle Group (two armored squadrons and one armored infantry rifle company)
- Infantry Battle Group (two armored infantry/mechanized infantry companies and one armored squadron)

A BG is commanded by a lieutenant colonel. The Armoured Infantry unit or Armoured Regiment that he commands provides the command and staff element of that formation. This ORBAT shows **one possible** organization of an Armoured Battle Group:

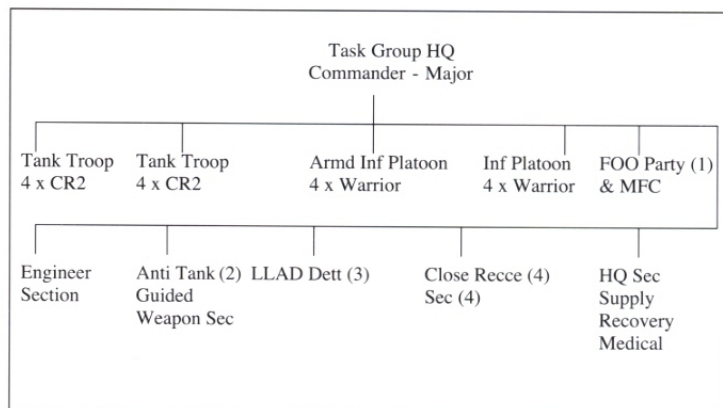


1. Armoured Squadron, Challenger 2
2. Armoured Squadron, Challenger 2
3. Low Level Air Defence, Stormer HVM (High Velocity Missile)
4. Anti-Tank Guided Weapon (ATGW), FV102 Striker or Light Anti-armor Weapon (LAW)
5. Engineer Detachment - equivalent to an Armoured Engineer Squadron (AES)

Company Groups/Task Groups

The BG operates in smaller formations, the so-called **Task Groups** or **Company Groups**, which are commanded by a major. They are allocated tanks, Armored Personnel Carriers (APC) and supporting elements depending on the mission required of them. Depending on the task, the BG is supported by air defense, anti-tank weapons, fire support and armored

engineers that ensure the BG is a balanced all-arms grouping. In this way, a BG can form three company groups:



1. Forward Observation Officer (FOO – usually a captain) with his party from the Royal Artillery. He will be in direct communication with a battery of eight guns and the Artillery Fire Direction Centre (FDC). The MFC (Mortar Fire Controller) is usually a sergeant from an infantry battalion mortar platoon who can direct up to six mortars. In most Combat Teams, both the FOO and MFC will travel in close proximity to the Combat Team commander.
2. Possibly 4 x LAW
3. Possibly 2 x Stormer HVM
4. Possibly 4 x Scimitar

It is noteworthy that a BG has no self-propelled guns. In the case of a requirement for artillery, the BG commander contacts the division, which will provide all necessary artillery support.

The Royal Dragoon Guards (RDG)

Yorkshire and Irish Cavalry (backbone of the RDG Armoured Battle Group)

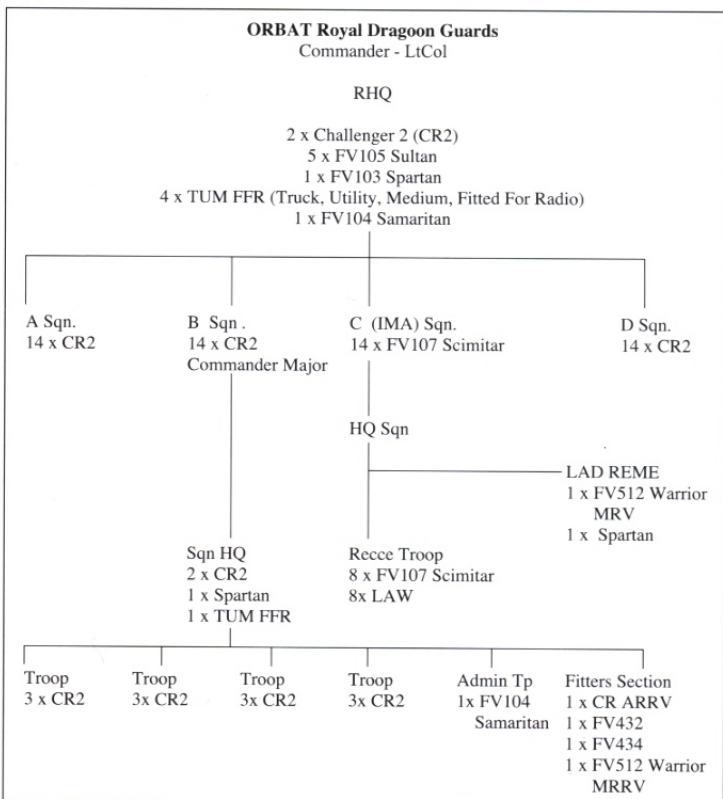


The Royal Dragoon Guards was formed on 1 August 1992 by the amalgamation of the 4th/7th Dragoon Guards and the 5th Royal Inniskilling Dragoon Guards. As both these units were themselves the result of earlier amalgamations in the 1920s, the RDG now carries the traditions and histories of four of the finest regiments in the British Cavalry - the 4th Royal Irish Dragoon Guards, the 5th Dragoon Guards, the 7th Dragoon Guards and the 6th Inniskilling Dragoon Guards. These units were all raised between 1685 and 1689 during the protracted contest for the English throne between James II and William of Orange.

After World War II, 4th/7th was dispatched to Palestine to support peacekeeping operations, plus it subsequently completed tours of the Suez Canal. From the mid-1950 through to 1992, both regiments served in the Middle East, Aden, England, Germany, Northern Ireland and Cyprus. The Royal Dragoon Guards adopted "Fare Thee Well Inniskilling" as its regimental quick march, a tune adopted from the 5th Inniskilling Guards.

The RDG is currently based at Münster, Northrhine-Westphalia, being the armored regiment of the 4th Mechanized Brigade. The regiment has four armored squadrons and one HQ squadron.

- A Squadron (The Blue Horse) - Challenger 2
- B Squadron (The Black Horse) - Challenger 2
- C Squadron (The Black Dragoons) Interim Medium Armour Squadron - CVR(T) FV107 Scimitar
- D Squadron (The Green Horse) - Challenger 2





The FV105 Sultan CVR(T) (Combat Vehicle Reconnaissance, Tracked) is the radio vehicle of armored regiments. This vehicle is based on the hull of the FV103 Spartan CVR(T) but it has a higher hull to provide space for maps and radios. There are five Sultans allotted to the HQ Squadron.

Usually an armored regiment has four armored squadrons with fourteen Challenger 2 MBTs, which are in turn divided into either four troops with three tanks each, or three troops with four tanks each, according to the task. The squadron leader and the 2nd-in-Command (2IC) have their own tanks. Referring specifically to the Royal Dragoon Guards, only three armored squadrons are equipped with the Challenger 2, giving a total of forty-four MBTs. In this case, C Squadron is the "Interim Medium Armour (IMA) Squadron" equipped with the FV107 Scimitar (see the later entry about C Squadron). The recon troop is under the direct command of the Battle Group commander, and it operates independently.



Specially equipped Sultans are used as re-broadcasting (REBRO) vehicles - these are used as mobile radio repeaters to receive signals and transmit them automatically on a different frequency to extend the range of communication links. Note the shortened track run - standard practice in the case of a torn-off idler - that still enables the vehicle to move under its own power!



C Squadron (The Black Dragons) – The Interim Medium Armour Squadron

The RDG is currently one of the first armored regiments to have one squadron equipped with the FV107 Scimitar CVR(T) (Combat Vehicle Reconnaissance, Tracked). Despite its light armor and 30mm gun, the squadron can still operate as an armored squadron responsible for direct-fire anti-armor tasks where these are limited to soft targets (for example, soft-skinned vehicles up to a maximum size of a BMP-1). The new **Interim Medium Armour Squadron (IMA)** was established because of the restructuring of the 4th Armoured Brigade into a mechanized brigade. CVR(T) vehicles are air transportable, which enables the squadron to deploy rapidly to any area – an important quality considering possible future operation scenarios.

Although it is planned that the CVR(T) will be replaced in the future, vehicles will undergo a modernization program and remain in service for a couple more years yet. Despite an international trend towards wheeled vehicles, it is believed that the future vehicle will be a tracked vehicle as well. It is noteworthy that conversion from the Challenger 2 (CR2) to the CVR(T) started in October 2005, and only one month later the squadron was fully operational!

C Squadron has a total of fourteen vehicles divided into three troops. Their main weapon is the 30mm L21A2 RARDEN gun. To engage heavy armor, C Squadron is equipped with seven LAWs.



All CVR(T)s have undergone a series of modifications during their service life. The latest one was the Life Extension Programme (LEP). Finally, all vehicles have now received the new Cummins 6B5.9 diesel engine as a replacement for the legendary Jaguar J60 No.1 Mark 100B 195bhp petrol engine. The 7,800kg vehicle can attain a maximum road speed of 80km/h. All CVR(T)s have a semi-automatic TN15 gearbox with seven forward and seven reverse gears, which enables the vehicle to pivot on its own axis.

The Sultan is fitted with a telescopic mast at the rear of the vehicle. A tent can enlarge the working area and it is often used to connect two vehicles together. The crew comprises a driver, commander and radio operator, plus the unit commander and his staff - providing a total of up to six soldiers.



C Squadron is armed with seven Light Anti-armour Weapons (LAW) to provide an anti-tank capability for Scimitar crews. As space is too restricted to transport additional rounds, the FV103 Spartan is used to provide this transport capability.



The crew of "Cracker Jack" waits for a new task. All vehicles are equipped with a recovery rope, a wise move prompted by previous experiences at the Drawsko-Pomorskie Training Area. Lots of crews who found themselves bogged down discovered that the towrope was their best friend!



This soldier engages a target with the 94mm LAW anti-tank weapon. It is fitted with the BT46 NLAW (Next-generation Light Anti-armour Weapon) program training system developed by Saab Training Systems of Huskvarna, Sweden. This laser-based simulator is used with the DFWES (Direct Fire Weapon Effect Simulator) to provide the realism required for tactical exercises. The LAW, also known as Rocket System 94mm HEAT (High Explosive Anti-Tank) L1A1, has a maximum effective range of 500m, and a combat range of between 20 and 300m. The ready-to-fire weapon weighs 9.5kg, while a single projectile weighs 4.6kg.



Vehicles of 1st Troop, C Squadron, come together for an after-action review. Note the vehicle's name "Celtic Warrior". All C Squadron vehicle names begin with a letter "C".

Briefings in the field are often the only chance to relax a bit during a tactical exercise or to grab a much-needed shave.



The additional stowage bins affixed to the rear of this FV103 Spartan named "Cumtanokuout" show that this vehicle was in service with an Air Defence Javelin section. REME (Royal Electrical and Mechanical Engineers) fitters of C Squadron use two FV103 Spartans and one FV106 Samson, as do the armored reconnaissance regiments.



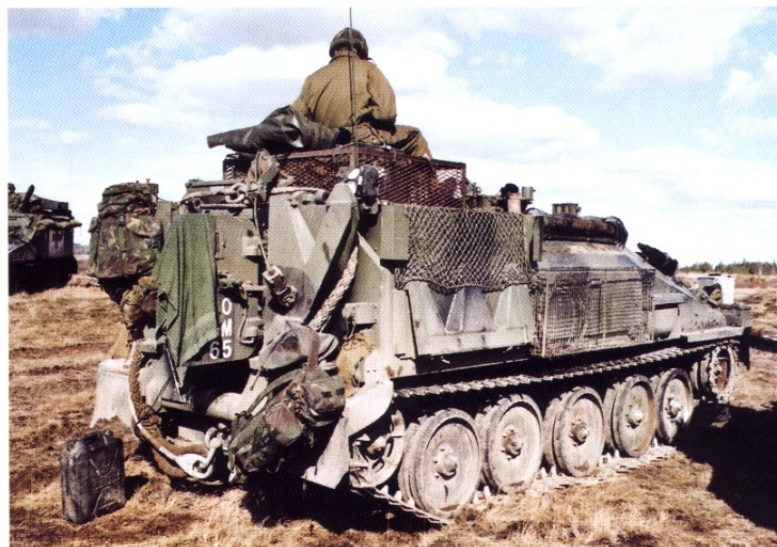
The FV106 Samson is the recovery variant of the CVR(T) series. It is equipped with an earth anchor that provides stability when using the 12-tonne recovery winch, which has a cable length of 229m. The pulling capacity can be increased to up to 18.8 tonnes using a double-reefed arrangement.

The Future Rapid Effects System (FRES)

Although the CVR(T) will remain within IMA squadrons for a while, the UK Ministry of Defence (MoD) has made plans for new vehicles that will meet FRES requirements. The new vehicle needs to:

- have an air-transport capability in the new A400M and C-17 aircraft to allow for fast deployments
- rationalize the existing fleet of battlefield infantry and reconnaissance vehicles
- give soldiers a rapid intervention capability with modern equipment
- provide a new network-centric capability that allows FRES to be linked to all current, modern and advanced equipment and systems used by the British Army.

Benefiting from its inherent air-transport capability, a FRES-based medium force should be able to deploy quickly. The MoD wants FRES to be available in both a reconnaissance and a direct-fire variant. It has not yet been decided whether the FRES will be a wheeled or tracked vehicle, but it is believed that the MoD wants the FRES to be tracked. It is possible an



A lot of specialist recovery equipment (e.g. tow bar, ropes, chains, and the middle part of the earth anchor) is stowed around this vehicle. The stowage bins on the hull top are mostly used to stow personal kit, tarps and camouflage nets.

existing chassis (such as that of the CVR(T) Scimitar) might be modified to meet FRES requirements, or alternatively a completely new vehicle might be produced.

Atkins Aviation & Defence Systems issued Invitations to Tender (ITT) in late 2004 to three contractors: BAE Systems, General Dynamics UK, and Giat Industries. At the time of writing, two bidders were expected to be awarded a contract for delivering the first demonstrator chassis. It is anticipated that the first vehicles will enter service in 2012, and that production will continue until 2028.

While a FRES-based medium force might be able to quickly deploy thanks to an air-transport capability, the war in Iraq has nevertheless demonstrated yet again that there is still a need for a heavy force with a strong war-fighting capability that makes use of major equipment like the Challenger 2 MBT and Warrior IFV. It was announced in March 2005 that the Army was to extend the service life of the Challenger 2 and Warrior from 2025-2028 through to 2035, enabled by further upgrades and improvements.

Armoured Reconnaissance (Recce)

Generally, both brigades of the 1st (UK) Armoured Division have one armoured reconnaissance regiment each. This is comprised of an HQ Squadron, two Sabre Squadrons and one Combat Support Squadron. These regiments provide formation reconnaissance tasks for the brigades. Although they are not part of a BG, the brigade can order the sabre squadrons to secure the flanks of armored formations.

Within a BG, reconnaissance is usually provided by the recce troops of the armored regiments or the recce platoons of the armored infantry battalions. The ATGW troops are an exception, as the BG has no armored anti-tank capability; therefore, this task is carried out by the ATGW troop of the reconnaissance regiment if required.



Staff Sergeant Sheehan, the 2IC of the Royal Dragoon Guards Recce Troop, proudly stands in the turret of his vehicle. This troop usually comprises eight Scimitars and it belongs to the HQ Squadron. It has a diamond-shaped call sign.



A Scimitar, with its turret traversed, stops to observe. The gunner can fire either quick single shots or a volley of six rounds. The following kinds of ammunition can be fired by the main gun: APDS-T (Armour Piercing Discarding Sabot Tracer), APSE-T (Armour Piercing Secondary Effect Tracer), HE-T (High Explosive Tracer) and PRAC-T (Practice Round Tracer). Oerlikon-Contraves HE, AP and PRAC rounds can be fired as well. A total of 201 30mm rounds and 3,000 7.62mm rounds can be stowed within the vehicle. The 30mm gun has an elevation from -10° to $+35^{\circ}$. Furthermore, the vehicle has two 4-barrel smoke dischargers for self-defense.



The Scimitar has a high power-to-weight ratio (24.5bhp/tonne), which provides an excellent cross-country capability. The low ground pressure allows the vehicle to negotiate areas that other vehicles cannot go. It is hard to acoustically identify the presence of the Scimitar when it is moving slowly at idling speed, and this makes it an ideal reconnaissance vehicle.



Once the troop has arrived at a new position, vehicles are parked in a manner that provides 360° protection. None of these vehicles are fitted with the new ESPIRE system.



Scimitar crews suffer from a lack of space to stow all their kit. A basket was fixed between the two turret stowage bins to provide more stowage space - a simple but useful improvement.



"23" shortly after reaching a new position. Note the LAW anti-tank weapon stowed above the rear turret stowage bin. The LAW is used dismounted from the vehicle.



"22", the Scimitar of the Recce Troop's 2IC, somewhere on the extensive plain of the Drawsko-Pomorskie Training Area (DPTA). The headlights are covered with Hessian.

A Scimitar makes a tactical stop at the edge of a forest. The vehicle's flat shape is optically hard to recognize, a trait that is reinforced with the use of natural camouflage.



A partially camouflaged Scimitar has taken up position at the edge of a forest, securing the advance of the BG at an obstacle at the DPTA in October 2005.

The gunner is provided with an AV No.38 Mk1 periscope and an AV No.54 Mk1 optical sight. An AV2 L3A1 night sight with a magnification of 1.8x and 5.6x is used for firing at night.



When the crew is battened down, the commander has an angle of sight of 30° to the right and to the left. The binoculars within the turret have single magnification for the left eye and 10x magnification for the right eye, so it is only possible to use the 10x magnification with both eyes. Scimitars that participate in the Future Rapid Effect System (FRES) program will be fitted with the Battle Group Thermal Imaging system.

It is not unusual for small formations like the Recce Troop to serve as OPFOR (Opposing Force) during an exercise. These Scimitars of the Royal Dragoon Guards Recce Troop use red tape and a red flag to identify themselves as OPFOR vehicles. Note the diamond call sign "22" on the vehicle's left-hand side, which identifies it as the vehicle of the troop's 2IC.





This FV107 Scimitar, obviously part of the OPFOR, is fitted with a 105mm imitation gun. Note the new Battle Group Thermal Imaging (BGTI) sight, a replacement of the common image intensifying sight. The BGTI will significantly enhance the effectiveness of vehicles at night and in poor visibility conditions. The vehicle belongs to the Reconnaissance Troop of 1st Battalion, The Royal Regiment of Fusiliers, currently based at Celle in Germany.

A Scimitar disembarks from a landing craft shortly before the start of Operation Telic in 2003. Note the Identification Friend-Foe (IFF) panels fitted at the front and on the turret, plus the improved mine protection underneath the front of the vehicle. (1 Armd Div)

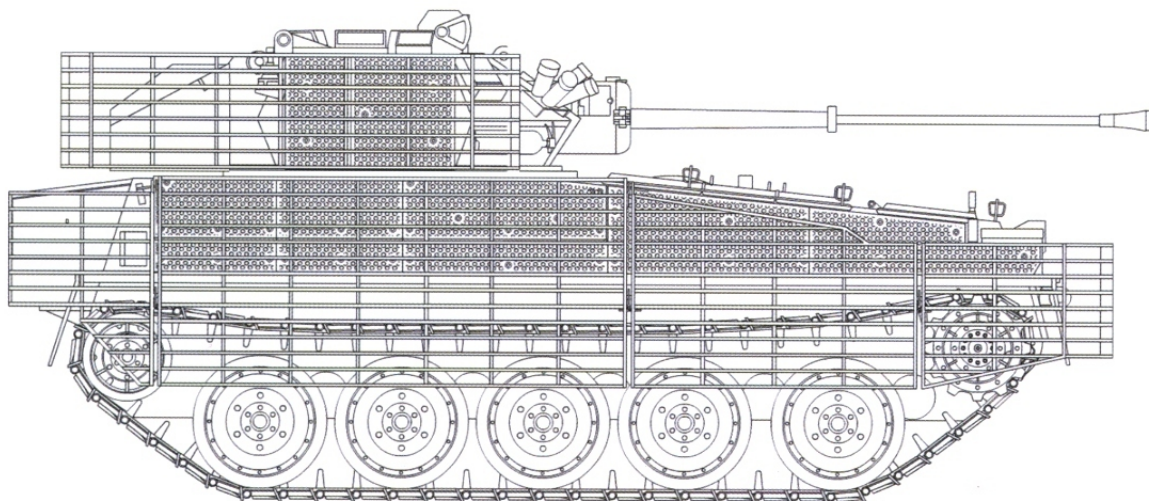


This Scimitar crew has captured an insurgent during a road patrol in Iraq, and this photo shows the vehicle's versatility. (1 Armd Div)



This Scimitar is fitted with the so-called Bar Armour. This metal cage is designed to detonate Rocket-Propelled Grenades (RPGs), one of the biggest threats during Operation Telic, before they reach the vehicle's own armor. (RAC Media Centre)

1/35 Scimitar w/Bar Armour





The Bar Armour is fixed around the whole vehicle. The principle of this armor is that the warhead first hits the cage and then explodes at a distance from the vehicle's own armor. The warhead then continues directly to the vehicle's armor, but will hopefully be deflected because its blast effect has been dissipated. (RAC Media Centre)

This photograph gives a good impression of how the Bar Armour is attached to the vehicle. The panels can be easily removed by hand-operated spring-held bolts. Behind the slat armor this vehicle is fitted with additional armor made of Kevlar; this provides protection against weapons ranging from grenade splinters to RPGs. (RAC Media Centre)



The Bar Armour is produced by General Dynamics. Vehicles are deployed to the theater without this armor and are fitted with it by personnel from the manufacturer after their arrival. (RAC Media Centre)

The FV103 Spartan is the Armored Personnel Carrier (APC) variant of the CVR(T) series. This vehicle is armed with a 7.62mm L37A1 machine gun mounted over the commander's cupola. In an armored regiment, the Spartan is used within the Squadron HQ, the IMA Sqn and the REME Light Aid Detachment (LAD). The vehicle's headlights are covered with tape as it is on active duty.



To improve protection of the Spartan during Operation Telic in 2003, vehicles were fitted with add-on armor plates produced by Israel's Plasan-Sasa. They provide protection against RPG rounds and grenade splinters. Additional mine protection is affixed under the vehicle's hull.

If the Battle Group (BG) commander requires the support of long-range Anti-Tank Guided Weapons (ATGW) he contacts the division, which can then deploy an ATGW troop from the formation's reconnaissance regiment. This is equipped with the FV102 Striker. The vehicle is armed with the Swingfire anti-tank missile, capable of engaging armored targets out to a distance of 4,000m.





An armored reconnaissance regiment has one Guided Weapon Troop (GW Troop) per squadron, with four FV102 Strikers each. One basic task is to identify the enemy's strength and direction, and to use its powerful anti-tank capability to delay and damage enemy reconnaissance forces, thus enabling the BG to advance.



The Striker needs well-concealed positions for firing its missiles so as not to be identified by the enemy. Once a Striker has reached its firing position, the launcher is elevated. Actually, the launcher is controlled manually by a thumb-operated joystick, which is demanding for the operator. All Strikers were modernized from 1990 onwards with the Automatic Commander Line-of-Sight (ACLOS), which guides the missile automatically to the target.



Each Striker can carry a total of ten Swingfire anti-tank missiles, five in the launcher and another five in special containers inside the vehicle. The vehicle has to be externally reloaded by a crewmember. The crew consists of three soldiers - driver, commander and missile operator. The latter is provided with the vehicle-mounted Swingfire Combined Sight Thermal Imaging device that allows operation under all-weather conditions.

A GW Troop prepares for a road march after having been on OP (Observation Post) duty. As well as the Swingfire main armament, the Striker is armed with the L37A1 7.62mm machine gun and two 4-barrel smoke dischargers. Some 3,000 7.62mm rounds can be stowed inside the vehicle.



The Armoured Regiment

Armored regiments use call signs composed of a number within a symbol.

The following call signs are used by the squadrons:

- A Squadron: Triangle
- B Squadron: Square
- C Squadron: Circle
- D Squadron: Rectangle
- HQ Squadron: Diamond

The different number codes inside the symbol have the following meaning:

- 11B: Commanding Officer (CO)
- 22B: 2nd-in-Command (2IC)
- 0B: Commanding Officer (i.e. squadron leader of an armored squadron)
- 0C: Squadron 2IC
- 10: Troop Commander First Troop
- 20: Troop Commander Second Troop
- 30: Troop Commander Third Troop
- 40: Troop Commander Fourth Troop
- 11: Gun Tank First Troop
- 12: Gun Tank First Troop
- 21: Gun Tank Second Troop
- 22: Gun Tank Second Troop
- 31: Gun Tank Third Troop
- 32: Gun Tank Third Troop
- 41: Gun Tank Fourth Troop
- 42: Gun Tank Fourth Troop



Although all Challenger 2 MBTs are based on converted Challenger 1 hulls, they are almost completely new vehicles. The most obvious improvement is the impressive turret that is a new development fitted with second-generation Chobham armor, and which provides protection against KE and HE rounds.



The Challenger 2 Main Battle Tank (CR2 MBT) is the pride of the armored regiments. It is the successor to the FV4030-4 Challenger 1 MBT, and was publicly introduced on 30 June 1998. A total of 386 were ordered to equip all armored regiments by 2002. The first regiment to receive the new Challenger 2 was the Royal Scots Dragoon Guards in Bad-Fallingbosten, Germany.



The 62.5-tonne Challenger 2 MBT is powered by a Perkins CV-12TCA Condor V12 4-stroke diesel engine with an engine capacity of 26.1 liters. This unit delivers 1,200bhp at 2,300rpm. It is connected to a David Brown TN54 automatic gearbox with six forward and two reverse gears, helping the vehicle achieve a maximum road speed of 56km/h on roads and 40km/h cross-country. The power-to-weight ratio is 19.2bhp/tonne.



The main armament of the Challenger 2 is the L30A1 120mm 55-caliber rifled gun. It is designed to fire all kinds of rounds used by the British Army i.e. APFSDS (Armor Piercing Fin Stabilized Discarding Sabot) and HESH (High Explosive Squash Head). A computer provides highly accurate fire control. Furthermore, the tank is fitted with a 7.62mm L94A1 coaxial machine gun and an L37A2 7.62mm General Purpose Machine Gun (GPMG).



A total of fifty 120mm rounds and 4,000 7.62mm rounds can be stowed inside the vehicle. It is noteworthy that the British Army is currently conducting trials with a German Rheinmetall 120mm 55-caliber smoothbore gun. A first demonstration by the Armour Trials and Development Unit took place at Heath Range, Dorset. (RAC Media Center)



Challenger 2 MBTs of A Squadron (The Blue Horse), The Royal Dragoon Guards, from Münster. These form the armored backbone of the Scots Guards BG, an Infantry BG comprised of two armored infantry companies and one armored squadron. All vehicles provide security for each other when moving tactically.



The armored squadron has reached its night hide. The tank commanders will then guide their vehicles through the woods some distance from the main thoroughfare. After having camouflaged their vehicles, the crews will finally find some time to have their 24-hour rations and catch up on some sleep. No tactical night moves were undertaken during Exercise "Prairie Eagle II 2006."



A Chieftain AVRE (Armoured Vehicle Royal Engineers) has dropped its fascine into an anti-tank ditch to enable the BG to advance. The Challenger 2's gun barrel is raised to its highest position to avoid digging into the ground when crossing the obstacle. Note the white rings on the gun's fume extractor, which identify the tank as a vehicle of the Third Troop.

The OC of A Squadron, The Royal Dragoon Guards, in the hatch of his Challenger 2 MBT. Note the GPS device next to his map, a useful item in the depths of the DPTA. A lack of significant geographical features makes it difficult to get around using only the map.



This Challenger 2, "11B", is the tank of LtCol Hymes, the Commanding Officer (CO) of The Royal Dragoon Guards. This photograph was taken during Exercise Prairie Eagle 2 beneath "Eagle's Nest", a vantage point at the DPTA from which Russian officers used to watch impressive exercises in Cold War times.



Following the Future Army Structure 2010 (FAS2010), both the 1st and 3rd (UK) Armoured Divisions will be structured equally with a total of six armoured regiments each. Three regiments of 3rd DIV will have three Challenger 2 squadrons, while the other three regiments of 1st DIV will have four Challenger 2 squadrons each.



A BG is a quite flexible structure providing effective combined-arms formations according to the requirements of a task. If an armored troop requires infantry support, an infantry platoon can be attached to the armored troop commanded by the BG commander.

The situation on operational tours is quite different from exercises; there are no simulations here! The driver of a Challenger 2 re-hydrates with bottled water during the summer heat of Iraq.



Another important part of the BG Exercise Prairie Eagle 2 was a rolling replenishment in the field. All vehicles were filled up, and the crews received new 24-hour rations and fresh potable water.

The gunner provides fire support with the GPMG whilst the tank is refueled by the tank commander. The Challenger 2 has a fuel capacity of 1,592 liters, enabling a range of 450km on roads or 300km cross-country. The refueling vehicle is a Bedford TM 8t UBRE (Unit Bulk Refueling Equipment).



The L7A2 7.62mm GPMG has a maximum range of 1,800m and a rate of fire of 625 – 750 rounds per minute.

This Challenger 2 watches out for enemy tanks during "Operation Telic", the liberation of Iraq, in 2003. It belongs to The Queen's Royal Lancers, identifiable by the regimental insignia "Death or Glory" situated between the IFF (Identification Friend-Foe) panel and the coalition marking. The call sign "10" within a rectangle shows that it is the tank of the troop commander, 1st Armoured Troop, of D Squadron. Note the additional fuel drums, exhaust suppressors and improved dust covers. (1 Armd Div)



Maintenance day after one week of exercises keeps the tank crews busy. All kinds of work on the tracks and suspension require teamwork and a good knowledge of the equipment. This crew of 2nd Troop, D Squadron, is changing the sprocket of their Challenger 2.





To gain access to the road wheels when they require changing, the reactive armor panels have to be removed. This photograph gives a good impression of how the armored side skirt panels are affixed to the vehicle during wartime. (RAC Media Center)

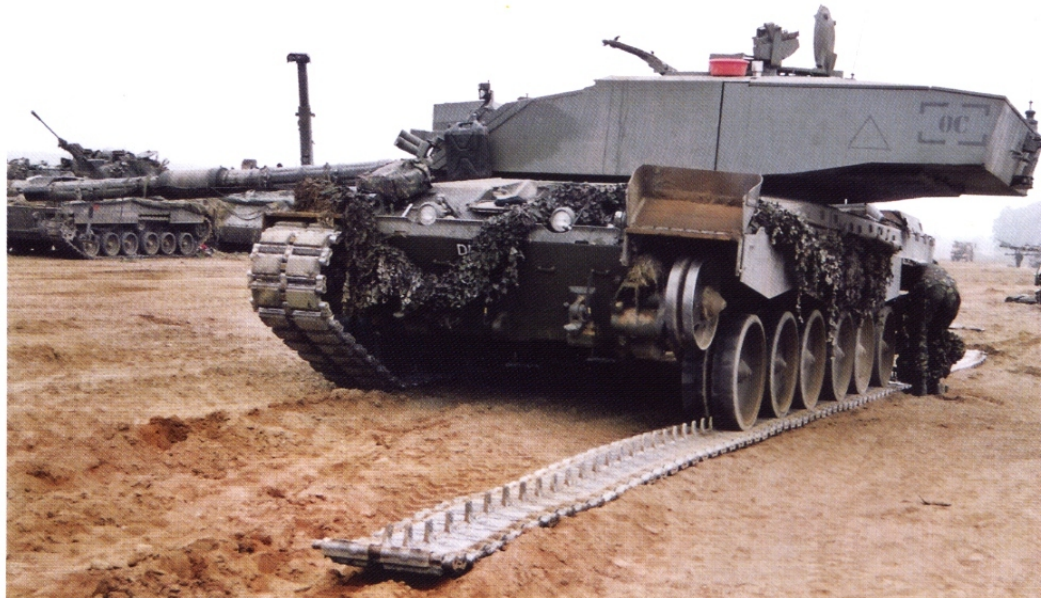


A good way to minimize dust raised by tracks is this apron fixed to the vehicle's side skirts. Generally, desert sand is harmful to the engine and transmission so this is a simple but helpful solution. (RAC Media Center)



The Challenger 2 is equipped with a small auxiliary 4-cylinder diesel engine that runs the electrical system independently of the main engine. This engine obviously needs the aid of REME fitters.

The Blair Catton improved double-pin design end-connector track links offer an average mileage of approximately 8,000km. Changing the tracks takes anywhere between twelve and twenty-four hours for a crew. A major advantage is the introduction of the Complete Track Delivery System (CTDS) that reduces the changing time drastically as the tracks are delivered in two parts for each side.



This Challenger 2 of A Squadron, 2RTR, was part of the OPFOR during the BG Exercise Uhlan Eagle 2005. Side skirts have been removed for better visual recognition. The big red cross and a mounted "anti-tank weapon" are part of the OPFOR features. The crew wears their desert battledress for easier recognition purposes when dismounted.



The combination of appliqué armor and Bar Armour fitted to this Challenger 2 of 2nd Troop, C Squadron, Royal Scots Dragoon Guards, currently provides the best protection for armored fighting vehicles in the British Army. The three white rings on the gun barrel identify this tank as the troop's third vehicle.



This Challenger 2 is fitted with the most modern armor used by the British - this armor is referred to as Bar Armour and Additional Armour. Instead of the L37 7.62mm GPMG, this tank is fitted with the OWS (Overhead Weapon Station) for trials at the Royal Armoured Corps Training Centre Bovington, in Dorset. The vehicle has no call signs as it is assigned to this training facility and does not belong to a regiment. (RAC Media Centre)

The rear view of the same vehicle obviously shows the sophisticated mounting of the Bar Armour. This feature improves survivability on the battlefield without increasing the vehicle's nominal weight. (RAC Media Centre)



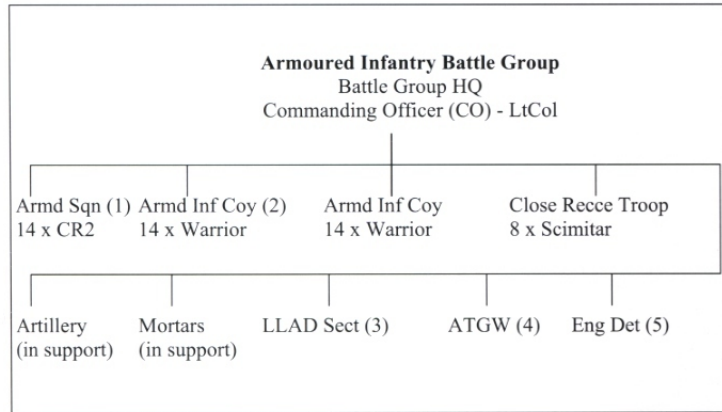
The current combination of Chobham Armour in conjunction with Bar Armour and passive appliqué armor provides the best protection for armored fighting vehicles used by the British Army. The appliqué armor was combat-proven during Operation Telic 2003 and it enabled armored formations to fight while under heavy enemy fire. (RAC Media Centre)



This detail shot clearly shows the arrangement of the Bar Armour on the vehicle's left-hand side protecting the sprocket. To carry out maintenance on the road wheels, it is not necessary to remove this panel. In the case of mounted Bar Armour, the additional fuel drums cannot be fitted any more. The armor can be removed easily when needed, for example to give access to the tow bar. (RAC Media Centre)

Armoured Infantry

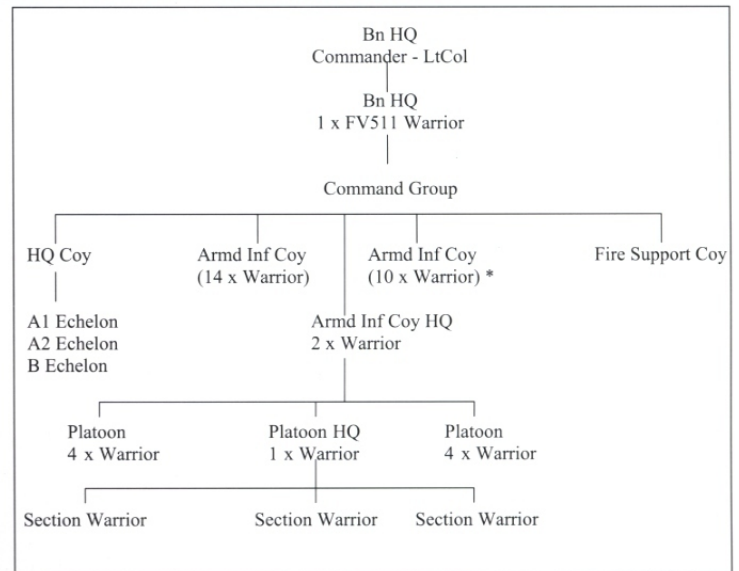
An Armoured Infantry Battle Group can have the following possible structure:



1. Armoured Squadron, Challenger 2 MBT
2. Armoured Infantry Rifle Company, Warrior IFV
3. LLAD – Low Level Air Defence, Stormer HVM
4. Anti-Tank Guided Weapon, LAW
5. Engineer Detachment, AES

Armored formations cannot operate without the support of armored infantry. The HQ of an infantry battalion can become a Battle Group HQ and be provided with armor, artillery and engineers to finally become a balanced Infantry Battle Group. Armored infantry companies can also be detached to the HQ of an armored regiment to make up Armoured Battle Groups, depending on the task.

ORBAT of an Armoured Infantry Battalion



* One platoon of the third rifle company is attached to the Fire Support Company in order to support the formation of assault pioneer platoons. This platoon is trained as an Assault Pioneer Platoon.

Total:

53 x Warrior
12 x Milan to be replaced by Javelin
21 x FV432
8 x Sabre
6 x 81mm mortar
741 soldiers all ranks

The main equipment of the armored infantry battalion is the FV510 Warrior Section Vehicle, which is armed with a 30mm L21A2 RARDEN cannon and a coaxial L94A1 chain gun. The rear compartment accommodates seven soldiers. The driver is seated at the front left, while the commander and gunner are situated in the turret. The infantrymen cannot fire their weapons from inside the vehicle. This photograph shows a Warrior fitted with side-slung fascines for crossing small ditches.





The 24.5-tonne Warrior is propelled by a Perkins CV8 TCA V8 diesel engine delivering 550bhp. In conjunction with a 4-speed automatic gearbox, the vehicle can achieve a maximum road speed of 75km/h. The left vehicle in this photograph has the call sign "44B", identifying it as the Battle Group Commander of the Light Infantry Battle Group. The second Warrior has traversed its turret to the rear to provide fire protection.

The FV510 Warrior Section Vehicle is the mainstay of armored infantry battalions and it operates in close association with Challenger 2 MBTs. The steel turret manufactured by Vickers Defence Systems has a powered traverse system. The commander is seated on the right and the gunner on the left. They are provided with optical and image intensifier sights and periscopes. The infantry soldiers in the rear compartment are provided with two further periscopes. Besides tactical exercises, all armored infantry units regularly go on gunnery courses. (Clemens Niesner)



Warrior IFVs of 1Bn, Scots Guards, secure a tactical route to an obstacle that the whole Battle Group is supposed to cross. Their headlights are covered to avoid being spotted by enemy reconnaissance.



The crew of this FV510 Warrior found some time to dry their recently laundered combat uniforms. Note the IFF panel mounted on the vehicle's side skirt. (1 Armd Div)



This Warrior awaits enemy contact while remaining beside a main road. Note the black smoke in the background that identifies a burning oil well set on fire by Iraqi forces to frustrate Coalition aircraft. (1 Armd Div)



This Warrior Infantry Fighting Vehicle begins a patrol during the stabilization phase of "Operation Telic" in 2003. It belongs to the 1st Battalion, The Royal Regiment of Fusiliers, which is based at Celle, Germany. Note the battalion's insignia to the right of the IFF-panel. The vehicle is fitted with an additional armor kit. (1 Armd Div)



A Warrior has breached an improvised obstacle on the outskirts of Basra. Note the additional armor on the front of the vehicle, which is designed in such a way as to make the vehicle hard to hit. Sloped and curved armor increases protection as a projectile striking at an angle must penetrate a greater depth of armor than if it was impacting at right angles. (RAC Media Centre)



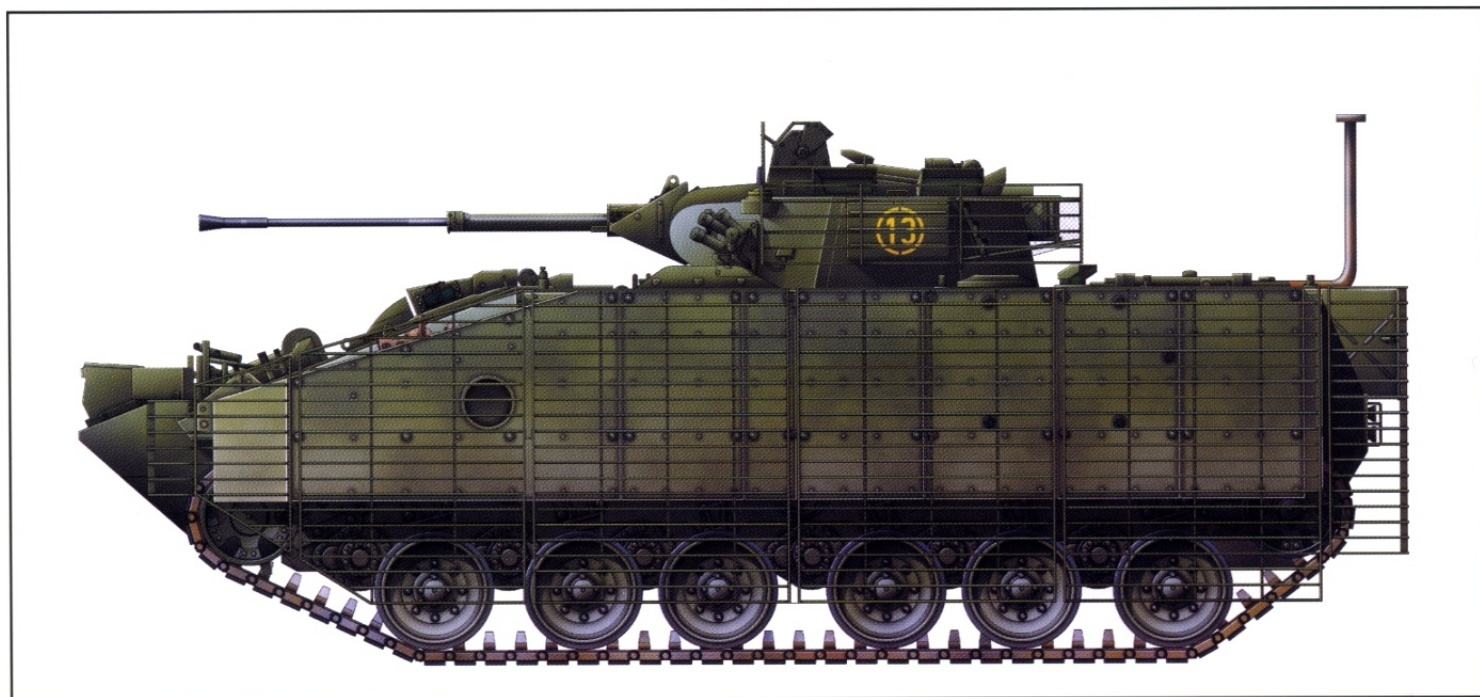
Daily business in the post-war period. This Warrior is leaving an improvised camp to go on a road patrol. In the background is a guard, protected by sandbags, watching out for hostile forces. (1 Armd Div)



The crew of this Warrior finds some time to relax after the end of an attack. Burning debris signals the battle that took place just a few hours ago. (RAC Media Centre)



This Warrior IFV is fitted with Bar Armour and the Surface Clearance Device (SCD) manufactured by Pearson Engineering. It is designed to clear surface laid mines and has a clearance width of 4.50m reduced to 2.80m for transport. SCD weighs 1,300kg. There are two versions: a vee-blade surface mine plough (SMP) for route clearance and the RORS (Rapid Ordnance Removal System) straight, side cast angled-blade for area clearance. (1 Armd Div)



The Warrior IFV is armed with a 30mm RARDEN cannon. The British Army is upgrading its Warriors to extend their service life to 2035. The upgrade includes the General Dynamics UK Bowman Tactical Communications System and the addition of a night-fighting capability in the form of the Thales Optronics Battle Group Thermal Imaging (BGTI) program. A new turret with a 40mm stabilized Case Telescoped Weapon System (CTWS), part of the British Army's Manned Turret Integration Programme (MTIP), will improve the vehicle's firepower.



An armored infantry company (Rifle Coy) has three platoons with four sections each. Generally a section has about eight or nine soldiers formed into two fire teams. A fire team is armed with three SA80A2 Individual Weapons (IW), one Light Support Weapon (LSW), and one 94mm LAW. Fire support is provided by a two-man team equipped with a 51mm Light Mortar. In this photo, dismounts equipped with a MILAN and a GPMG quickly move forward to their firing position. When leaving the vehicle they have no protection and must go to their hide immediately. (Clemens Niesner)



A convoy of OPFOR Warriors of 1st Battalion, The Royal Regiment of Fusiliers, deploys from its night hide on a foggy morning along the fringes of the Drawsko-Pomorskie Training Area. This final phase of Exercise "Prairie Eagle II 2006" was the last challenge for the Scots Guards Battle Group during their two-week exercise.



Fitted with a dummy gun over the main gun and bearing a red cross, this Warrior of 1st Bn Scots Guards, is obviously part of the OPFOR. The side skirts have been removed to improve identification as an OPFOR vehicle.



Depending on the task given to the BG, armored infantry platoons can be attached to armored squadrons to carry out infantry missions. The major advantage of the battle group principle is that the formation can be formed flexibly enabling the Battle Group commander to react quickly. (Clemens Niesner)

Warrior Manned Turret Integration Programme (MTIP) and Battle Group Support Vehicle (BGSV)

MTIP is a £6 million contract that involves the fitting of a CTA International 40mm Cased Telescoped Weapon System (CTWS) and a stabilized armament system (this was part of the recently announced **Warrior Lethality Improvement Programme [WLIP]**). Some 449 Warriors are to be upgraded under WLIP, and a further 125 vehicles will be converted into **Battle Group Support Vehicles (BGSV)**. The BGSV program has a possible in-service date of 2011, having been cancelled at least twice previously (when it was called the M1P1 APC). The M2P2 8x8

MRAV (Multi-Role Armoured Vehicle) was a tri-national (Germany, Netherlands and UK) wheeled armored vehicle, but the UK left the program in 2003.

The BGSV is designed to replace a large number of FV432 vehicles, plus it is capable of operating with the Challenger 2 and Warrior in the direct fire zone so requires a similar degree of protection. Alvis Vickers Ltd was awarded a contract to convert some 125 vehicles. It is believed that the BGSV will enter service in 2007.



This is the one of the first photographs of the Warrior Battle Group Support Vehicle (BGSV). It is the final element in the British Army armored vehicle program and is designed to work alongside the Challenger 2 and Warrior close to enemy forces. Besides its new tracks and suspension, the vehicle is outfitted with a completely new hull and does not have a turret.

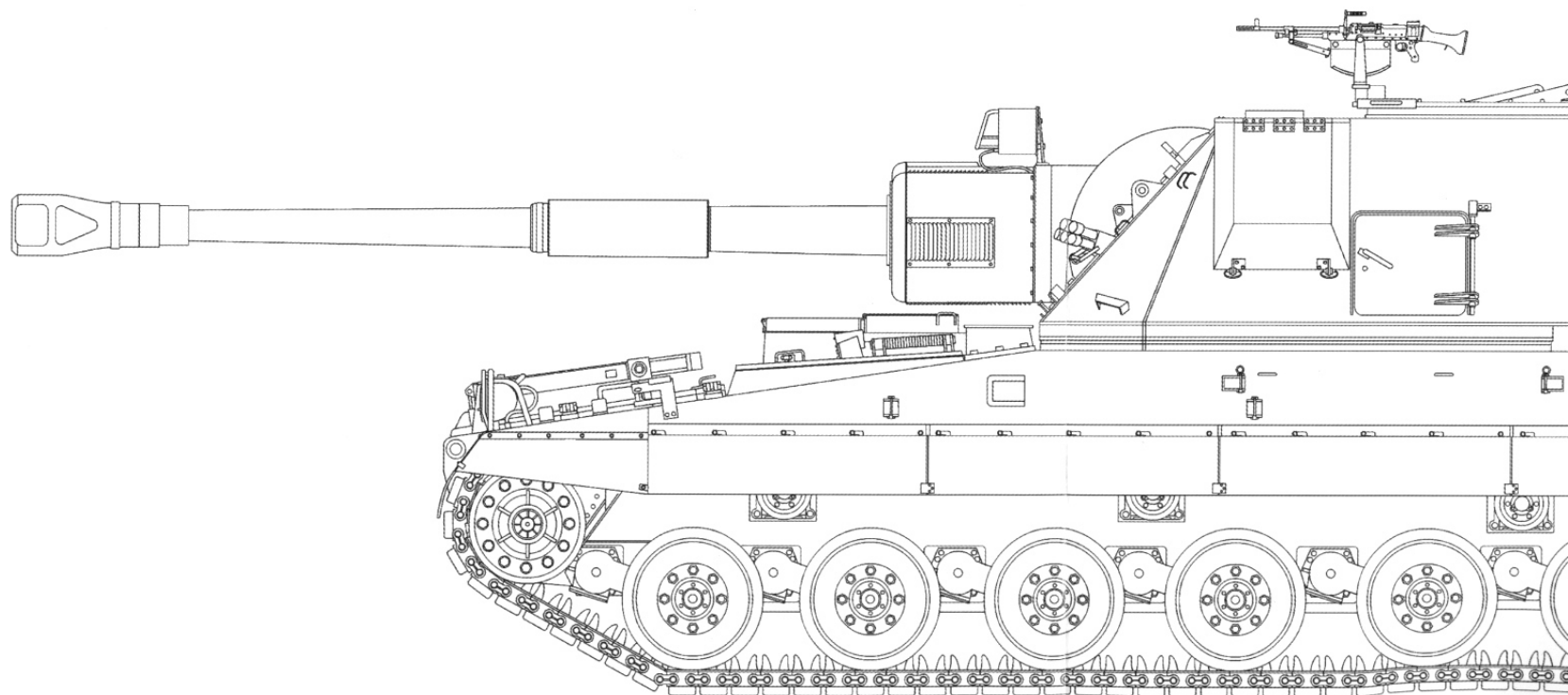


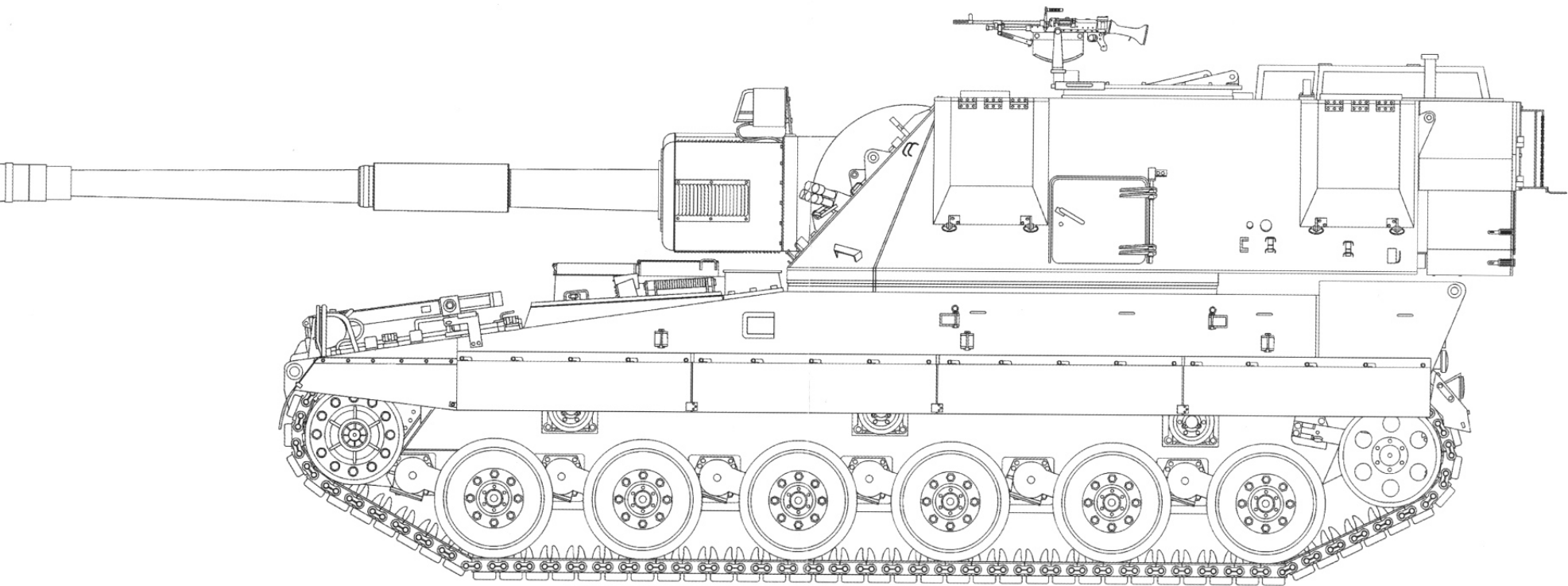
The new BGSV will be designed for use as a command post, armored ambulance or general support vehicle. It is envisioned the BGSV will enter service in 2008.

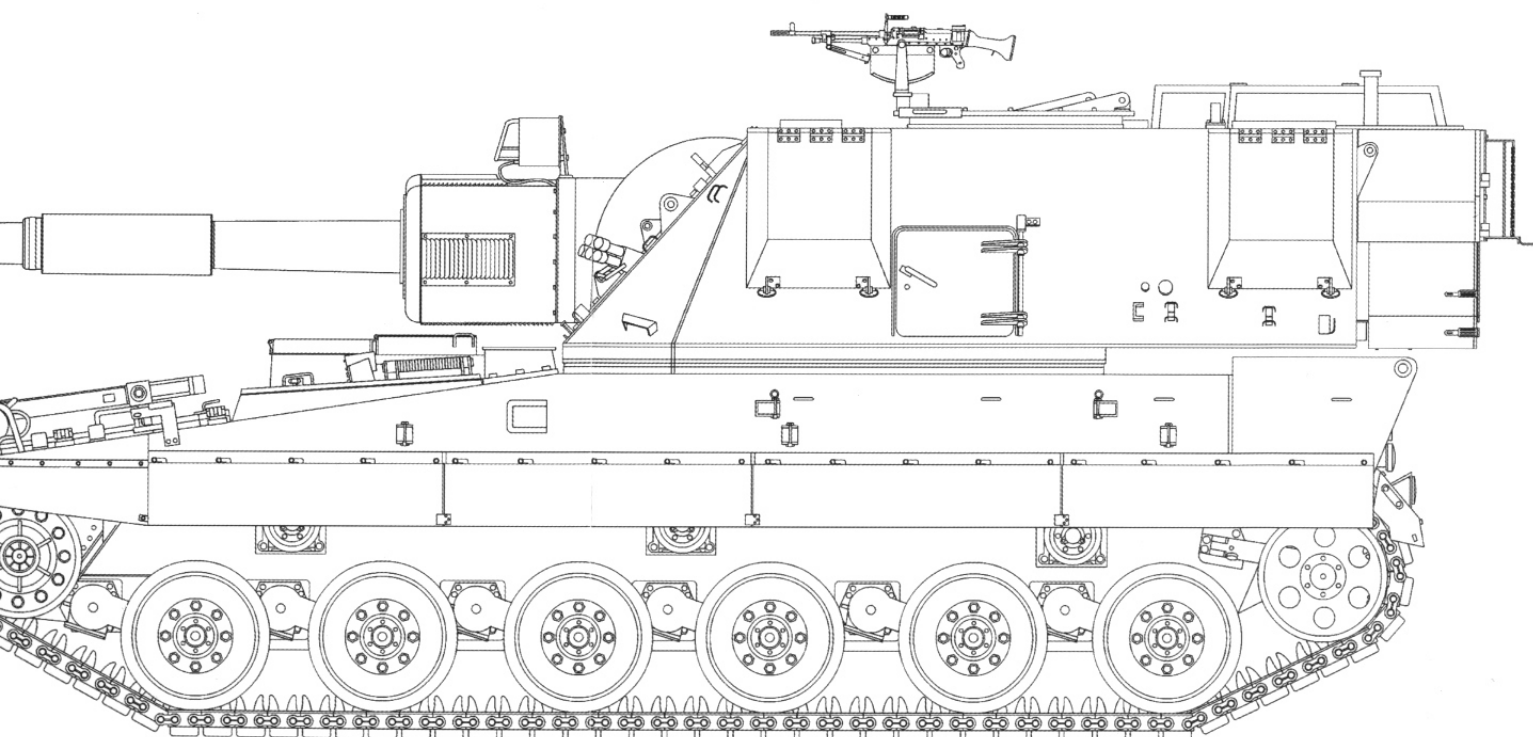


This photograph shows the interior of the Warrior BGSV. It is obvious that the lack of a turret provides more space for the crew. Note the map table on the left-hand side. A total of up to six soldiers can be carried within the vehicle. The BGSV is being produced by British Aerospace Systems Land Systems.

1/35 AS90

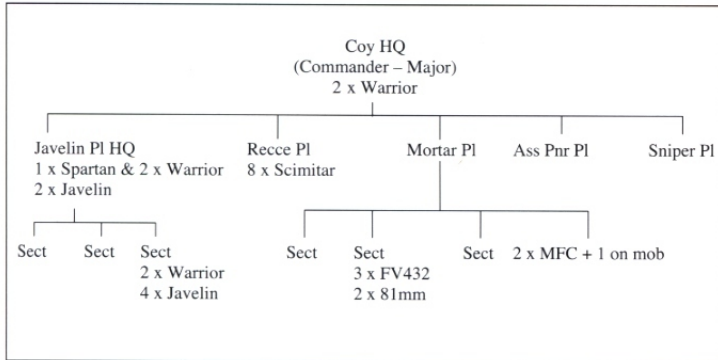






Fire Support Company

An important part of an armored infantry battalion is the **Fire Support Company**, which includes a Javelin Anti-Tank Platoon, a Recce Platoon, a Mortar Platoon and an Assault Pioneer Platoon. The latter is supported by one Warrior section detached from the second rifle company. Soldiers of this platoon are fully trained as assault pioneers so as to provide a large repertoire of combat engineer expertise.



All armored infantry battalions have a platoon with up to nine L7A2 7.62mm GPMGs for the sustained fire role. This weapon has a maximum effective range of 1,800m and has a practical rate of fire of 200 rounds per minute; a cyclic rate of 625 – 750 rounds can be achieved as well. The whole gun (including tripod) weighs 13.62kg.



The Mortar Platoon of the Fire Support Company use the FV432 equipped with an 81mm L16A2 mortar. One section has three FV432s, two equipped with a mortar. In total, the Mortar Platoon has six FV432 mortar vehicles. The crews of these FV432s of the Light Infantry Fire Support Company are closed down as they make a tactical move.



The Javelin is the new portable antitank weapon used by antitank platoons of armored infantry battalions. It is the successor to the MILAN ATGW and consists of a 6.4kg Command Launcher Unit (CLU) and a missile round with a range of 2500m. The Javelin provides a "fire and forget" capability, and it is guided automatically by an infrared seeker. The Javelin can be operated as a shoulder-launched or tripod-mounted system. This picture shows the mounted Launch Tube Assembly (LTA) containing the missile.



An FV432 Mortar Carrier waits for a fire mission in a hide. The mortar barrel is fixed on a large turntable mount, and it fires through opened hatches. The turntable can traverse 360°. The mortar can also be used dismounted if required; the ground baseplate and mount are usually affixed externally on the side of the vehicle.



The Fire Support Group of the 1st Bn, The Light Infantry, also has a Sniper Platoon equipped with the TUM (Truck, Utility, Medium) Land Rover XD "Wolf". Each Land Rover has a crew of three, including one radio operator.



The FV432 Mortar Carrier can carry some 160 81mm rounds and has a crew of six. A fully laden vehicle weighs 16.4 tonnes. It is believed that the FV432 will remain in its Mortar Carrier role as no Warrior replacement has yet been planned. The mortar has a minimum range of 100m and a maximum range of 5,650m. The normal rate of fire is fifteen shells per minute.



These snipers are well camouflaged using a so-called "Ghillie" suit, named after Scottish hunters. The Sniper Platoon has six teams with two snipers each. The Accuracy L96A1 7.62mm rifle is the basic sniper weapon. It weighs 6.5kg and has a maximum effective range of 1,000m and a magazine capacity of ten rounds. In combat a sniper carries a capacity of thirty rounds. Another weapon that is used is the Schmidt & Bender L17A1.



This shot shows the barrel of the 81mm mortar. Note the additional shells stored in special tubes on the left-hand side. The crew's 24-hour rations and other personal kit are stored inside the compartment. The main type of round is the L36A2. The L36A3 contains 680g of TNT and is detonated by the L127A2 nose fuse on impact. The L40A1 shell is designed to produce a white phosphorous smokescreen that lasts sixty seconds. The Practice L27A1 round is reusable and has no fuse; it has a limited range of 80m.

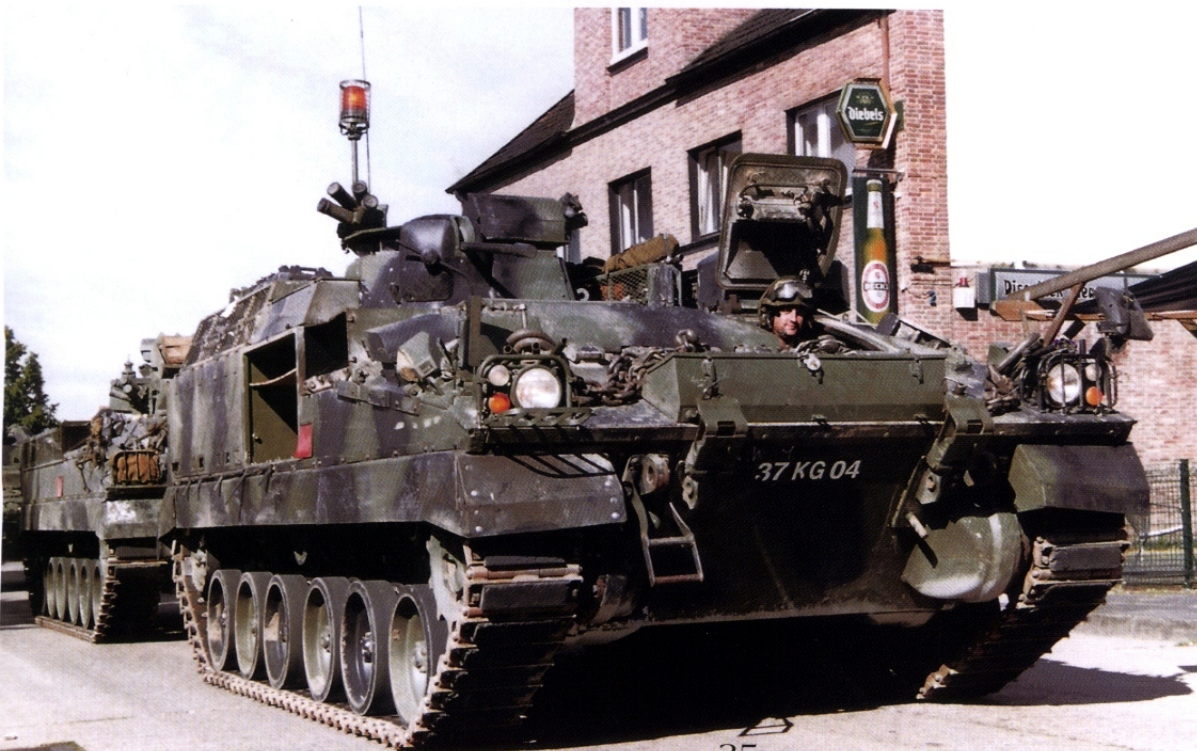
REME (Royal Electrical and Mechanical Engineers) Fitters

Although they are not directly involved in frontline battles, REME fitters are an important part of keeping the BG rolling and are often the “forgotten” men. They provide frontline repairs, conduct recovery tasks and have lots of special tools and equipment to ensure that operational formations can complete their assigned missions.

This REME Fitters FV432 of A Squadron, The Royal Dragoon Guards, is fitted with a telescopic mast to provide radio communications. Two CVR(T) stowage bins are fixed over the vehicle's rear door.



This picture shows an REME Fitters FV432 of C Squadron, The Queen's Royal Hussars, from Paderborn. REME FV432s can be easily recognized by special kit stowed around the vehicle, for example the lifting equipment for a power pack stowed on the vehicle's front.



The FV513 Warrior Repair and Recovery Vehicle (MRRV) is the recovery version of the FV510 Warrior. It is fitted with a 6.5-tonne hydraulic crane and can also lift a Challenger 2 power pack. A heavy 20-tonne winch can recover vehicles weighing up to 38 tonnes using a double-reefed recovery arrangement. An earth anchor is lowered to provide stabilization for the vehicle during recovery operations.



The FV512 Warrior Combat Repair Vehicle (MCRV) is almost identical to the FV513, but it has no recovery winch. The rear compartment carries a lot of spares, special tools and other recovery kit. The crew benefits from a compressor used to drive power tools for frontline repairs in the field. A hydraulically operated jack is lowered when the crane is in use. A special GKN-built high-mobility trailer for transporting complete power packs can be towed by the MCRV.



Part of the Fitters section, 1 Armoured Engineer Squadron, 21 Engineer Regiment (from Osnabrück), is on the move. As the position was not secure and the OPFOR could appear from any direction, one soldier provides self-defense with his SA80A2.



This High Mobility Trailer Type T4 is laden with a new power pack sealed in plastic. A small stock of complete power packs is deployed on exercises. When engines cannot be repaired in the field, they are taken to the Power Pack Repair Platoon, which has special equipment for checking, repairing and fixing complete power packs.



The Challenger Armoured Repair and Recovery Vehicle (CR ARR) is the main workhorse of REME fitters within armored regiments. It is based on the hull of the Challenger 1 MBT but has the David Brown TN54 6-speed gearbox used by the Challenger 2 MBT. The CR ARR is also known as Rhino, a name prompted by its impressive power. Every armored squadron has one CR ARR.

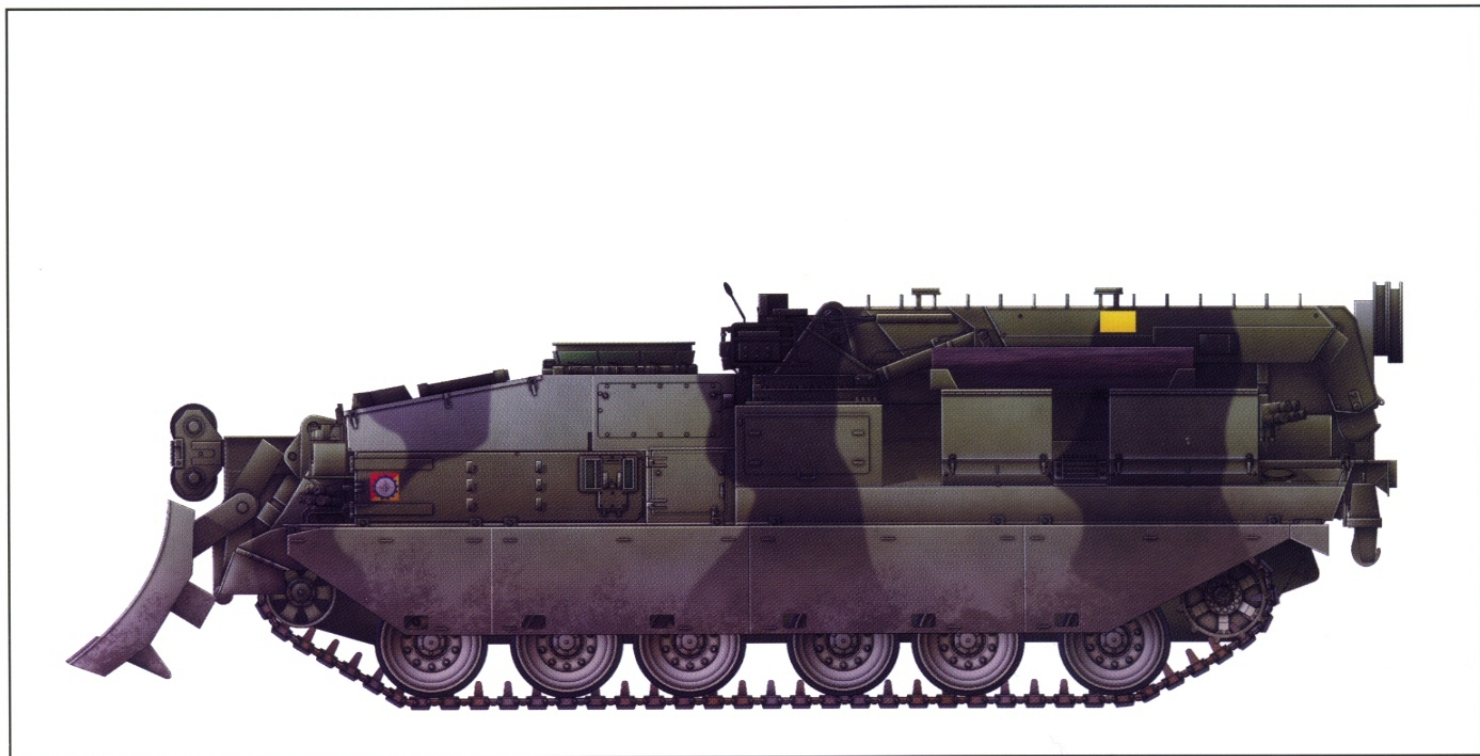
Besides carrying out recovery tasks, the Rhino is also used for earthmoving operations and breaching obstacles with its dozer blade. In connection with the Rotzler Treibmatic heavy recovery winch (capable of pulling 51 tonnes, which can be doubled by a special cable arrangement), it operates as an earth anchor. The winch has a cable length of 150m. The auxiliary Plumett TL 15 winch has a pulling capacity of 15 tonnes. Both winches are operated from the driver's position.



The 62-tonne CR ARR V is powered by a Perkins Condor CV12 TCA 12-cylinder 4-stroke diesel engine that delivers 1,200bhp at 2,300rpm. The Rhino can achieve a maximum speed of 60km/h on roads and 40km/h off-road.

The Rhino has a 360° traversable Atlas AK6000M8 telescopic boom crane with a lifting capacity of 6.5 tonnes. The crane has its own electrically driven hydraulic pump that enables it to lift its own power pack if necessary. A small auxiliary engine provides electrical power independent of the main engine.





The powerful Challenger Armoured Repair and Recovery Vehicle, also known as "Rhino", is designed to provide front-line recovery of disabled armored vehicles, in particular the Challenger 2 MBT. The recovery winch is capable of pulling 52 tonnes, which can be doubled by reefing the cable. The Atlas hydraulic crane has a lifting capacity of 6.5 tonnes.

The CR ARRV usually has a crew of three (commander, driver and radio operator), plus two fitters. There are two further seats for additional soldiers (e.g. of broken-down vehicles). The vehicle is provided with an NBC system and a chemical toilet. The Rhino is armed with the commander's 7.62mm L37A2 machine gun.



A Challenger Armoured Repair and Recovery Vehicle (ARRV), also known as "Rhino", tows a disabled Challenger 2 of B Squadron, The Royal Dragoon Guards. It was photographed at the Drawsko-Pomorskie Training Area during Exercise "Prairie Eagle 2" in March 2006. The Rhino is the last vehicle of the Challenger family to have the old single-pin tracks but it still retains the gearbox and engine of the Challenger 2. Since its introduction in March 1992, some eighty vehicles have entered service with the British Army.

Medical Support

To provide medical support within the BG (medical evacuation on the battlefield), it is necessary to employ light armored frontline vehicles to maintain the speed and mobility of the armored formation. There are two kinds of tracked vehicles for this role - the FV104 Samaritan (part of the Battle Group HQ) and the FV432 APC.

The FV104 Samaritan is designed to carry casualties under armor from the battlefield. The vehicle has a raised superstructure providing space for four stretcher cases or five seated casualties. In peacetime the crew consists of two soldiers - the driver and the commander, who is also a medical orderly. Under combat conditions the crew would have an extra orderly so the commander can concentrate on guiding the vehicle.



The red crosses are covered when operating tactically. This vehicle commander has just removed the cover for a new stage of the exercise. The Samaritan is also part of the RHQ's admin troop and is automatically part of the Battle Group Main HQ.

The FV432 Ambulance is a converted personnel carrier with the seats removed and replaced by sliding swivel stretcher racks, two per side. It is also possible to fit only one side with stretchers and the other side with five seats to transport sitting casualties. The FV432 Ambulance is unarmed but is fitted with smoke dischargers. The vehicle is in use with the Royal Artillery, Armoured Infantry and Armoured Engineer Squadrons.



Engineer Detachment

Armored engineers fulfill an important role on the battlefield. They ensure their own troops' mobility and survivability, conduct counter-mobility tasks and general engineering support, including route maintenance, all kinds of construction tasks and water provision, to name but a few.

The British Army has formed Close Support Engineer Regiments within the Royal Corps of Engineers to support the armored brigades. Focusing on the 1st (UK) Armoured Division, the following Close Support Engineer Regiments support the allocated brigades:

- 21 Engineer Regiment => 4th Mechanized Brigade (Osnabrück)
- 32 Engineer Regiment => 7th Armoured Brigade (Bad Fallingb.ostel)
- 35 Engineer Regiment => 20th Armoured Brigade (Paderborn)

A Close Support Engineer Regiment has three Armoured Engineer Squadrons (AES). Every AES provides engineering support for its allocated BG. An example is the case of **29 Armoured Engineer Squadron**, 35 Engineer Regiment, from Paderborn. This unit provides engineering support for the **Light Infantry Battle Group (LI BG)**.



35 Engineer Regiment, currently based at Paderborn, is the Close Support Engineer Regiment of the 20th Armoured Brigade and is comprised of four squadrons:

- 44 HQ Squadron



- 29 Armoured Engineer Squadron



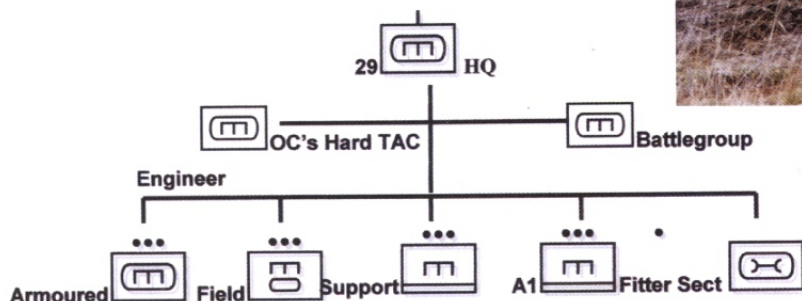
- 37 Armoured Squadron



- 77 Armoured Squadron



ORBAT of 29 Armoured Engineer Squadron



An armored engineer squadron comprises of the following elements:

Armoured Engineer Squadron Headquarters (AES Squ HQ)

On exercises or operational tours, the Sqn HQ is divided into two sections:

- The first section is equipped with FV436 radio vehicles that provide communications at the squadron level.
- The second section supports the Battle Group HQ with the Battle Group Engineer (captain) providing tactical and technical armored engineering knowledge to the Battle Group Commander and his planning staff. This section uses an FV436 Armoured Staff Vehicle, the OC's (Officer Commanding) FV511 Warrior Command Vehicle, the Squadron Sergeant Major's FV103 Spartan CVR(T), and an FV432 Radio Vehicle for re-broadcasting tasks (relay station)



This FV103 Spartan Combat Vehicle Reconnaissance (Tracked) CVR(T) is the vehicle of the Sergeant Major. It weighs 8.153 tonnes and is powered by a Cummins 6B5.9 diesel engine delivering 195bhp. All CVR(T) vehicles use a semi-automatic gearbox with seven forward and seven reverse gears. The vehicle is armed with a mounted L7A2 GPMG and two 3-barrel smoke dischargers for self-defense. A total of 2,000 7.62mm rounds can be stored inside the vehicle.



The FV511 Warrior Armoured Command Vehicle has been in service with armored engineers since 2003. It is the CO's vehicle and provides high mobility on the battlefield. Although the vehicle has a turret, the gun barrel is a wooden dummy since the interior is fitted with radio and communication systems.

A large fleet of FV432s is used by the armored engineers. This photograph shows an FV432 radio vehicle used for re-broadcasting operations. It weighs 15.28 tonnes and has a maximum road speed of 52.2km/h.



Field Troop

The Field Troop provides a battlefield combat engineering capability in support of armored troops in tasks like obstacle breaching, route preparation or force protection. The Field Troop is divided into four field sections that use the FV432 APC. Furthermore, the Field Troop employs two FV103 Spartan CVR(T)s, one for the troop commander and one as an armored reconnaissance vehicle.



Soldiers of a Field Troop prepare a mine-cleared corridor using orange defile markings to mark the way for advancing troops. This is a manpower-intensive task and has to be done quickly to avoid enemy reconnaissance.

The Field Troop is also able to lay minefields using the Barmine layer, which ploughs a furrow into the ground and lays the "Full Width Attack Mine". It takes the crew about one hour to lay mines over a front of some 600 – 700 meters. An FV432 can carry 144 mines stored on pallets of seventy-two mines each. The mines are delivered by a hand-loaded conveyor system. All mines are armed automatically when passing along the conveyor. On exercises, the crew uses L11A2 and L20A1 dummies that are nothing but sand-filled cardboard containers that are biodegradable and can be left in the ground.



Support Troop

The Support Troop plays an important role within the BG as it uses specialist equipment to provide route maintenance, force protection and counter-mobility tasks. This troop uses an FV432 as a command vehicle and also has an FV103 Spartan for reconnaissance. The Support Troop has a Combat Engineer Field Section with one FV432 that tows a Barmine layer as well.



The Support Troop is equipped with three FV180 CETs (Combat Engineer Tractors), a multi-purpose vehicle with amphibious capabilities. The vehicle uses a 1.72m³ aluminum-alloy bucket for earthmoving operations, but it can also be used for transporting trackways or other equipment. The CET can be driven from either end using reversible seats and duplicate controls. The crew consists of two soldiers - the driver and the commander. Note the raised flotation screen.



A CET engaged on one of its main tasks - digging. As the vehicle has a recovery winch with a capacity of 8 tonnes and a rope length of 113m, it is often used to recover dug-in fascines that the Chieftain AVRE can barely lift. The development of these vehicles started in 1968, and production commenced in 1977 at the Royal Ordnance Factory at Nottingham. A total of 141 vehicles were ordered. The CET will be replaced by the Terrier in the future.



The CET is propelled by a Rolls-Royce C6TFR 6-cylinder diesel engine with an engine volume of 12.17 liters. It delivers 320bhp at 2,100rpm. The 18-tonne vehicle has a maximum road speed of 52km/h. The CET is armed with one 7.62mm L4A4 machine gun and two 4-barrel smoke dischargers. Some 336 rounds (twelve magazines) can be stored inside the vehicle.



Two JCB 4CX Light-Weight Tractors (LWT) are used by the Support Troop for medium digging operations. This versatile vehicle has a maximum lifting capacity of 3,410kg and has an excellent cross-country capability.



Two CASE 721 CXT Medium Wheeled Tractors (MWT) are used by the Support Troop for carrying out major earthmoving operations using the 3m³ bucket. The MWT can also transform into a forklift by using a hydraulically operated quick-change fitting. Note the spare tire and additional kit stowed in the bucket for road marches.



Two massive Unipower Tank Bridge Transporters (TBT), part of the BR90 (Bridging for the 1990s) family, belong to the A1 ECH group. These vehicles are designed to carry spare Close Support Bridges (CSB) that are used by the Chieftain AVLB (Armoured Vehicle Launched Bridge). This 8x8 truck is based on the Unipower M-Series and can go wherever the AVLB goes. This TBT is laden with a No.12 CSB with a length of 13.5m. Two of these bridges can be transported together by stacking one on another.

The MWT can also be used for laying Class 70 trackways using a simple mechanism connected to the bucket by a chain.

REME Fitters Section

The REME Fitters Section provides maintenance, frontline repair and technical support to the AES. They are equipped with an FV432 APC that is used as a command vehicle, two FV434 maintenance vehicles and a Challenger ARR. On exercises and on deployment the Fitters Section is placed under the command of the AES.



Two FV434s of 29 AES on Exercise "Uhlán Eagle 2005". These vehicles are fitted with a 1.25-tonne HIAB crane that enables it to lift the power pack of a Chieftain AVRE/AVLB. The rear compartment is designed to transport specialist tools needed for carrying out repairs in the field, as well as wooden bars used to provide a hardstand for removed engines. A laden vehicle weighs 17.5 tonnes. The FV434 can also recover broken-down vehicles of a similar size using a tow bar.

Armoured Troop

The Armoured Troop is the heavily armored element of an AES. It is equipped with three Chieftain AVREs (Armoured Vehicle Royal Engineers) and three AVLBs (Armoured Vehicle Launched Bridge). The main tasks are obstacle breaching, crossing gaps and other obstacles using the Close Support Bridge (CSB) or Maxi Fascine. An Armoured Troop is commanded by a captain based in an FV103 Spartan CVR(T). Another Spartan is used for reconnaissance. The FV432 is the Armoured Troop's radio vehicle.



The FV4205 Chieftain AVLB, also known as a Bridgelay, is one of the main workhorses of the Armoured Troop. They entered service with the armored engineers in 1974. The major portion of thirty-seven vehicles was delivered to 32 Armoured Engineer Regiment. The AVLB weighs 53.3 tonnes and can reach a maximum road speed of 43km/h.



An Armoured Troop has three Chieftain AVLBs. This photograph shows the two different CSBs used by armored engineers - the No.12 and the No.10. The latter is a scissors-type bridge with a length of 26m, which enables it to span a 24.5m-wide gap. This bridge has a weight of 10.68 tonnes. It takes the AVLB about twenty minutes to launch a bridge (including safety checks).

The troop leader's FV103 Spartan and FV4205 Chieftain AVLB of 29 AES on Exercise Piper's Resurrection 2005 at the Sennelager Training Centre, Germany. The Spartan's headlights are covered as necessary when operating tactically. The AVLB has a crew of three - driver, commander and radio operator. The driver is located at the front and is provided with a single-piece hatch cover and a day periscope that can be exchanged for a passive periscope for night operations. In addition, the vehicle is fitted with an NBC system.



This Chieftain AVLB is laying a No.12 CSB, the shortest one having a length of 13.5m; this enables it to cross a 12m-wide ditch. This bridge weighs 5.63 tonnes and entered service in 1997. Engineering reconnaissance is necessary before an obstacle can be crossed in order to decide which kind of bridge is most suitable. Note the Spartan in the background. Two No.12 bridges can be transported together when stacked. This allows the AVLB to either lay one bridge and move on to a second obstacle, or to extend the bridge's length.





The impressive No.10 Bridge is launched hydraulically in three stages. A disadvantage of this type of bridge is that its height allows it to be seen from a distance when being launched. No other obstacles (e.g. electric wires or trees) can be close to the crossing site as they would prevent the bridge from being launched.



A Chieftain AVLB crosses a tank ditch with the aid of a dropped fascine. The vehicle has just launched its bridge and retracted all its cylinders into the travel position, thus giving a good view of its launching mechanism. Once the AVLB has laid the bridge, it disconnects and withdraws to a hide or advances to pick up another bridge.



The Chieftain AVRE (Armoured Vehicle Royal Engineers) is the other heavy armored vehicle of the Armoured Troop. It is the successor to the Centurion AVRE and is basically designed to make anti-tank ditches trafficable by dropping Maxi Fascines, transporting track-ways, breaching minefields or battlefield obstacles, and carrying out earthworks. When operating with the Python mine-clearing device mounted on an AVRE trailer, a lane 7.3m wide and 185 - 200m long can be cleared of mines.

The AVRE is fitted with two nose-mounted platforms that can be tilted hydraulically for launching or recovering fascines or track-ways. It has its own hydraulic crane with a lifting capacity of 2.9 tonnes at a maximum extension of 5.45m. It is designed to load the vehicle and can be operated from both an operating panel on the vehicle or from a remote control. In most cases, dug-in fascines are covered with mud and are too heavy for the AVRE's crane, so it needs the support of the COLES mobile crane. Note the tilted rear platform giving access to the engine compartment.





The principle of a fascine is quite simple and dates back to World War I when armored engineers adapted the first tanks for engineering tasks. A bundle of timber was transported on those vehicles in order to drop them into anti-tank ditches to make them crossable. A Maxi Fascine has a length of 4.6m, a diameter of 2.2m, a weight of 2.5 tonnes, and consists of seventy-five plastic pipes. The outer pipes are connected by a chain, while a net at both ends prevents the inner pipes from slipping out.



A primary function of the AVRE is to provide mobility support for armored BGs, breaching obstacles and minefields. For this task the Chieftain AVRE can be fitted with the Track-Width Mine Plough (TWMP), the Full-Width Mine Plough (FWMP), or the BEMA (Bulldozer Earth Moving Attachment).

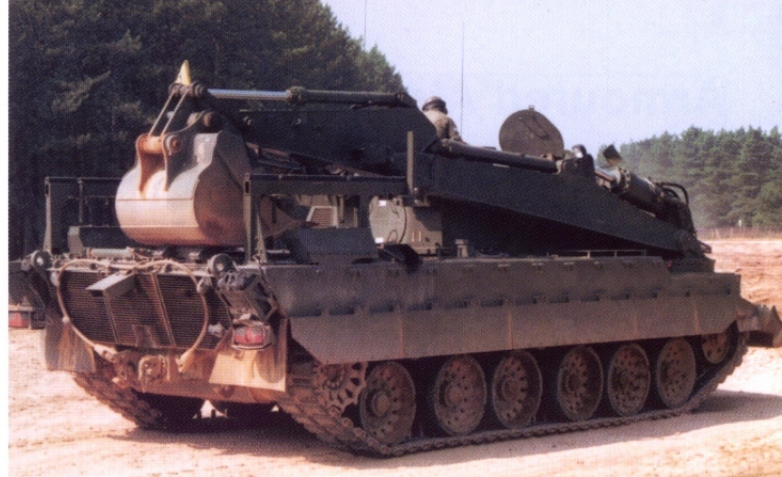
Soldiers of 29 AES changing a TWMP for a BEMA. The dozer blade weighs 2,200kg and has a width of 3.67m. It takes a well-trained crew about sixty minutes to change it. The BEMA has to be removed manually as the Chieftain AVRE has no hydraulically operated front-end equipment for a quick exchange.



Shortly before the AVRE meets an obstacle, the driver tilts the front platform into the dropping position before releasing the fascine. The fascine drops under its own weight in a relatively fast procedure. After having dropped the fascine, the AVRE crosses the obstacle and breaches the berm if necessary to enable the BG to advance as quickly as possible. As this vehicle bears another fascine, it can proceed to the next obstacle. In wartime, fascines are considered disposable and remain in the ditches.



An AVRE during a refueling operation. Note the tilted rear platform that gives a good view of the stowed BEMA. Note the additional stowage bins around the vehicle that are needed to store all kinds of equipment and personal kit.



Trojan, successor to the Chieftain AVRE, is of a completely new design. Based on the Challenger 2 hull, the vehicle is fitted with an excavator arm that will be used for dropping fascines. It is noteworthy that the Royal Engineers will no longer use Maxi Fascines but smaller ones transported on the vehicle's rear hull. All new vehicles will enter service at the end of 2006. (Collin Knapp)



The Terrier is the successor to the ageing CET. Weighing 31.5 tonnes, it is a much heavier vehicle compared to its predecessor, but it will be fully air transportable in an A400M or C-17 aircraft. (BAE Systems Land Systems via Major T Slater, RLC Close Armour Integrated Team)

Titan will be the new bridgelayer based on the Challenger 2 chassis. Titan can launch the 26m No.10 Bridge within two minutes or two No.12 Bridges can be laid in about ninety seconds. Spans can be bridged when using integral trestles and wedges and a multiple combination of bridges. The Titan can be fitted with the same front-mounted equipment as the Trojan (BEMA and mine plough). (Engineer Training & Advisory Team)



Armoured Air Defense

The air defense detachment of an Armoured Battle Group is provided by parts of the Division's Close Air Defence Regiment. 12 Air Defence Regiment Royal Artillery, currently based at Paderborn-Sennelager, Germany, is the air defense regiment of the 1st (UK) Armoured Division that provides close air defense to its assigned brigades and BGs. The regiment comprises three firing batteries that support the armored brigades:

- 9 (Plassey) Battery, 20th Armoured Brigade
- 12 (Minden) Battery, 7th Armoured Brigade
- 58 (Eyre's) Battery, 4th Mechanized Brigade.

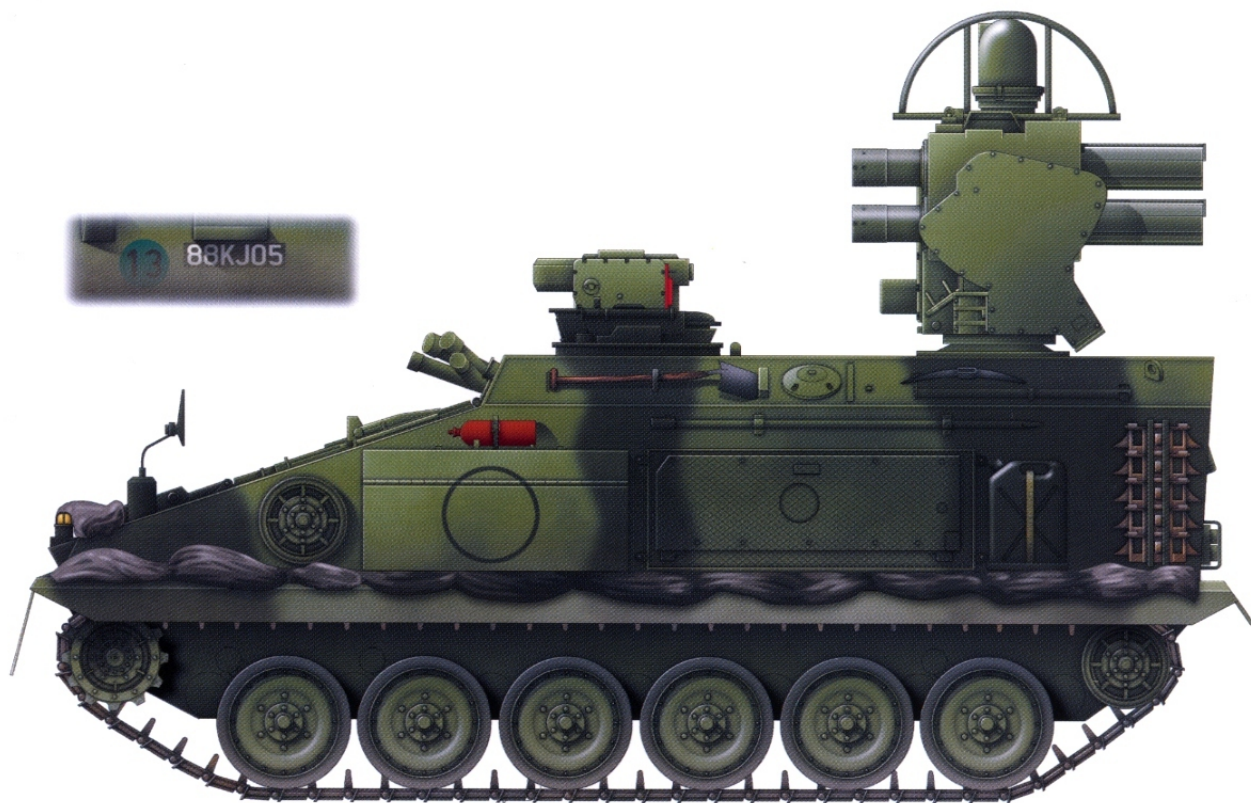


A Stormer HVM of 58 (Eyre's) Battery, 12th Air Defence Regiment of the Royal Artillery (currently located at Paderborn-Sennelager, Germany), has parked at this elevated position in order to maintain radio contact. Parts of the vehicle's rear are covered with mud to make visual recognition more difficult. This vehicle participated in Exercise "Flying Rhino" in September 2002. As this was an exercise at the battery level, the vehicle has no call signs. All vehicles of this battery are usually marked with a circle.

Each firing battery has twenty-four Stormer HVMs divided into three troops. 9 (Plassey) Battery, supporting the 20th Armoured Brigade (including the Light Infantry Battle Group) is divided into D, E and F Troops. Each vehicle has a capacity of twenty missiles.

The Stormer is an armored air defense vehicle armed with the Starstreak High Velocity Missile (HVM), optimized to counter threats from enemy anti-tank helicopters. Stormer is based on the box-like aluminum superstructure of the Spartan CVR(T), but has a strengthened chassis and one extra road wheel. The crew consists of three - the driver, commander and missile operator. The Starstreak HVM has a length of 1.39m and a diameter of 0.27m. It achieves a maximum speed of Mach 3+ and has a maximum range of about 5.5km. This two-stage rocket carries three warhead projectiles called "darts", each with their own guidance and warhead control unit.





This Stormer HVM belongs to 58 (Eyre's) Battery, 12th Air Defence Regiment of the Royal Artillery. The call sign used by the battery is a circle and is only seen during regimental exercises. The 12th Regiment will leave Germany and go back to the UK in 2007.



A Stormer TRV of 9 (Plassey) Battery, 12th Air Defence Regiment, moves tactically during Exercise "Prairie Eagle 2". The yellow flag was used for recognition within the BG. The vehicle is closed down.



The FV434 is the recovery vehicle of the air defense's REME fitters. On deployment and exercises the FV434s are allocated to the batteries, so this FV434 obviously belongs to 58 (Eyre's) Battery. Its call sign is in a circle.



Even a fitters' vehicle sometimes needs the aid of mechanics! Undoubtedly, the FV430 series is getting rather old. The first vehicles rolled out in the late 1950s and some are still in service, so it is not unusual to see them undergoing repairs!

Artillery Component

Battle Groups and Combat Teams rarely go into action with an integral artillery element. If the FOO operating within the Combat Team requires artillery support, he orders it from the division. The FOO is responsible for fire planning and directing the fire of guns onto the target. They move under armor in vehicles equivalent to other support troops, this enabling them to keep up with the formation being supported. They are in contact with:

1. The gun positions
2. The battery commander at Battle Group Main HQ
3. The Regimental FDC
4. The Company Group being supported.

Once a target is identified, the FOO will call fire from the guns and he will then adjust the fall of shot to cover the target area.



The FV514 Warrior MAOV (Mechanised Artillery Observation Vehicle) is used only by the Royal Artillery Forward Observation Officers (FOO) operating within BGs. The vehicle does not have a real 30mm gun, but rather a dummy. Therefore, the only armament is the L94A1 7.62mm machine gun. Inside the MAOV there are extra observation and artillery survey devices including a thermal imaging system.



A key element of the MAOV is the BATES (Battlefield Artillery Target Engagement System) delivering target data to AS90 self-propelled guns or MLRS (Multiple Launch Rocket System). The MSTAR (Man Portable Surveillance and Target Acquisition Radar) stored in the vehicle's rear stowage boxes provides accurate correction data for friendly artillery and mortar fire.

An FV432 radio vehicle is part of the Battery Command Post (CP), in this case 159 (Colenso) Battery, 26 Regiment Royal Artillery. A tent is fixed to the rear to enlarge the working area. A Battery CP comprises two FV432 radio vehicles and one Land Rover XD TUM with the recce officer. The first vehicle provides the "in-action CP" whilst the other vehicle is the "CP-setup", which goes on recce and sets up immediately. The in-action CP will then move together with the guns.



The AS90 155mm self-propelled howitzer is the current gun system used by the Royal Artillery. Its N307P1 39-caliber barrel enables the gun to fire standard L15 155mm ammunition out to a range of 24,700m. The range can be increased up to 30,000m using enhanced-range (Base-Bleed or BB) rounds. The minimum range is 3,000m.



The 155mm howitzer is mounted in an all-steel turret developed by Vickers Defence Systems. The AS90 is fitted with the Automatic Gun Laying System (AGLS) in conjunction with the fire control computer, while a land navigation system enables the gun to work autonomously. The gun also has a direct-fire capability.

The AS90 has a crew of five - driver, commander, gun layer and two ammunition handlers. The powered auto-loading system allows the crew to fire three rounds in less than ten seconds, or six rounds a minute for three minutes. The more usual sustained rate of fire is two rounds a minute. The AS90 can fire a total of 2,500 rounds before the gun barrel has to be changed. It is planned that the existing gun barrel will be replaced by a longer 52-caliber version to extend the range with standard ammunition to 30,000m and up to 40,000m using enhanced-range shells.





The 45-tonne vehicle is powered by a Cummins VTA 903T-600 V8 4-stroke diesel engine delivering 660bhp at 2,800rpm. A maximum road speed of 55km/h can be achieved. The 750-liter fuel tank enables a road range of approximately 370km. The muzzle brake of this AS90 has been removed for maintenance.



Five stowage bins are arrayed around the turret. A total of thirty-one shells and charges can be stowed in four modules, with another seventeen stowed around the turret. This AS90 crew is preparing their gun for a tactical move.



An AS90 on a fire mission during the first phase of "Operation Telic". The Royal Artillery is assigned to the Armoured Divisional Artillery Group (DAG). The DAG's composition varies in combat according to the task. Usually a firing battery is comprised of eight guns in wartime. In peacetime it is six guns per battery (for regiments in Germany) or four guns per battery (for regiments in the UK).



It can be expected that each of the four BGs in the brigade would have a Battery Commander (BC) to act as the Offensive Support Advisor to the Battle Group commander.

Epilogue

Battle Groups are a flexible instrument enabling an agile response to quickly changing situations. Different arms are combined and work together as a whole with the right mix of armor, infantry and other supporting arms. There will never be a static structure representing a typical BG, with the final combination always depending on the specific

task given it by the brigade. Although the total number of MBTs and IFVs will be reduced in the future, they will continue to play an important role on the battlefield despite the establishment of Mechanised Brigades, and will remain the backbone in high-intensity war fighting in the coming decades.



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